Remarks

In the Office Action of April 22, 2005, the Examiner rejected claims 1-27 under 35 U.S.C. § 112, second paragraph; objected to Figs. 1-4; and rejected claims 1-27 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,485,586 to Brash et al. ("Brash").

By this Amendment, Applicants have amended claims 1-4, 6-9, 14, and 22 to improve form and propose amending Figs. 1, 2, and 4.

Claims 1-27 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Regarding the rejection of claim 1, Applicants submit that claim 1, as amended, is clear and definite and in full compliance with 35 U.S.C. § 112, second paragraph.

The Examiner additionally points to claims 5, 7, and 9, stating that "it is unclear what the applicant means by 'a predetermined point in its processing'." Applicants respectfully disagree with the Examiner and submit that this language is clear and definite. Claim 5, for example, recites altering processing in an arbiter when the arbiter has not passed a predetermined point in its processing. Applicants submit that, as described in the specification and as would be realized by one of ordinary skill in the art, the arbiters recited in the pending claims may perform arbitration processing on input arbitration items. The processing is not instantaneous, and may be said to include a number of processing "points." As recited in claim 5, processing for an arbitration item is altered when the arbiter has not passed a predetermined processing point. Applicants submit that this language is therefore clear and definite. Claim 7 similarly recites a

"predetermined point in processing" and claim 9 recites "an arbitration point beyond a commit point." Applicants submit that these phrases are also clear and definite and the rejection of these claims should also be withdrawn.

The Examiner further points to claims 17, 22, and 28 under 35 U.S.C. § 112, second paragraph, citing "similar problems as in claims 1, 5, and 7." Based on rationale similar to that given above, Applicants submit that the rejections of these claims under 35 U.S.C. § 112, second paragraph, are also improper and should be withdrawn.

The Examiner objects to Figs. 1-4 because, according to the Examiner, these figures contain acronyms that are not suitably meaningful or are ambiguous. Applicants do not agree with this objection. However, in order to expedite prosecution, Applicants propose amending Figs. 1, 2, and 4 to spell-out or delete certain of the acronyms that were previously included in these figures. Applicants submit that Fig. 3 does not include any indefinite or confusing acronyms and has thus not been amended. Accordingly, Applicants submit that this objection to the drawings should be withdrawn.

Claims 1-27 stand rejected under 35 U.S.C. § 103(a) in view of Brash. For the following reasons, Applicants respectfully traverse this rejection.

Independent claim 1, as amended, is directed to system comprising a plurality of arbiters that each simultaneously arbitrate among common elements of a resource. The system includes conflict logic configured to detect conflicts among the plurality of arbiters accessing the elements of the resource, and,

when a conflict is detected, the conflict logic is configured to alter processing relating to the conflict in one of the conflicting arbiters.

Brash is directed to a queue based arbiter that arbitrates between N devices of a computer system. (Brash, Abstract). The N devices in Brash are system devices in a computer system that communicate over a bus. (Id.). The arbiter of Brash is said "to provide fair access to the bus by maintaining a queue of requests that come in from each resource in the computer system. (Id.).

Brash does not disclose or suggest each element recited in claim 1. Amended claim 1, for instance, recites a plurality of arbiters that each simultaneously arbitrate among common elements of a resource. Brash does not disclose or suggest a plurality of arbiters. Instead, Brash discloses a single arbiter that arbitrates among N devices.

The Examiner appears to contend that Brash, in describing an arbiter that can handle multiple priority levels, discloses multiple arbiters. (see Office Action, page 3, citing column 7, lines 49-50 of Brash, and the first few lines on page 5 of the Office Action). In Fig, 6, Brash discloses an arbiter that can "support a hierarchical, two priority level scheme." (Brash, col. 7, lines 53 and 54). The arbiter shown in Fig. 6 of Brash includes a low priority section 252, a high priority section 254 and a grant control logic section 256. (Id., col. 7, lines 55-57). Low priority section 252 is coupled to low priority request lines and high priority section 254 is coupled to high priority request lines. (Id., col. 7, lines 57-61). The grant control logic section 256 of Brash is described as controlling "whether the

low priority section 252 or the high priority section 254 can grant access to the bus 30." (Brash, col. 8, lines 17-20).

Applicants submit that the arbiter shown in Fig. 6 of Brash is a single arbiter that includes multiple sections, not a plurality of arbiters, as recited in claim 1. Brash clearly describes the arbiter shown in Fig. 6 (arbiter 250) as a single arbiter: "As shown, the arbiter 250 comprises a low priority section 252, a high priority section 254 ... ." (Brash, col. 7, lines 55-57). (Emphasis added). Further, even if one were to assume that sections 252 and 254 of arbiter 250 were separate arbiters (a point Applicants do not concede), these sections do not "each simultaneously arbitrate among common elements of a resource," as is also recited in amended claim 1. Instead, as is clearly described in column 7 of Brash, sections 252 and 254 or arbiter 250 each receive and arbitrate among different request lines; they do not arbitrate among common elements of a resource. (see Brash, column 7, lines 58-61; in which Brash describes the low priority request lines being coupled to section 252 and the high priority request lines being coupled to section 254).

Amended claim 1 further recites "conflict logic configured to detect conflicts among the plurality of arbiters accessing the elements of the resource, and, when a conflict is detected, the conflict logic is configured to alter processing relating to the conflict in one of the conflicting arbiters." Brash does not disclose or suggest any such conflict logic. The Examiner appears to contend that grant control logic 256 of Brash discloses the conflict logic recited in claim 1. Grant control logic 256 of Brash switches between low priority section

252 and high priority section 254, but does not detect conflicts among the plurality of arbiters accessing the elements of the resource, as is recited in claim 1. As previously mentioned, low priority section 252 and high priority section 254 receive and arbitrate among different lines and, thus, there could not possibly be any conflicts among sections 252 and 254 of Brash in accessing the elements of a resource, as recited in claim 1.

For at least these reasons, Applicants submit that Brash does not disclose or suggest each of the features recited in claim 1. Accordingly, the rejection of claim 1 should be withdrawn. The rejections of claims 2-8, at least by virtue of their dependency on claim 1, should also be withdrawn. Further, these claims recite additional features not disclosed or suggested by Brash.

Claim 3, for example, recites that the plurality of arbiters include a first arbiter and a second arbiter, and that the first and second arbiter are each implemented as a series of pipeline stages. In rejecting claim 3, the Examiner states that "[b]ecause a series of pipeline stages is a series of execution stage, it would have been obvious to one of ordinary skill in the art to recognize that the teaching of two separate queues of Brash et al. would have been obvious a series of pipeline stages because all the requests in the low priority requests must wait until the requests of higher priority requests are done before the low priority requests could be processed." (Office Action, page 5). Applicants disagree with the Examiner's rationale. In the rejection of claim 1, the Examiner appears to equate the recited plurality of arbiters with the low priority section 252 and high priority section 254 of Brash. In the rejection of claim 3, the Examiner

appears to be inconsistently equating each of sections 252 and 254 with a single stage of a pipeline. Applicants submit that this interpretation of Brash is not reasonable. Nowhere does Brash disclose or suggest that either one of sections 252 or 254 of Brash are implemented as a series of pipeline stages. Accordingly, for this reason also, Applicants submit that the rejection of claim 3 is improper and should be withdrawn.

Claim 4 further defines the features of claim 3 and recites that the first arbiter arbitrates based on flow control and the second arbiter arbitrates to manage congestion of the elements in the resource, the first arbiter having a higher priority than the second arbiter. Brash also does not disclose this feature of the invention. As noted by the Examiner, Brash discloses arbitrating between higher and lower priority requests. Arbitrating based on different priorities, however, cannot reasonably be said to disclose or suggest a first arbiter that arbitrates based on flow control and a second arbiter that arbitrates to manage congestion. Accordingly, for this reason also, Applicants submit that the rejection of claim 4 is improper and should be withdrawn.

Claim 5 further defines the features of claim 1 and recites that the conflict logic alters the processing relating to the conflict in the one of the conflicting arbiters when the one of the conflicting arbiters has not passed a predetermined point in its processing. Brash also does not disclose this feature of the invention and the Examiner does not specifically address this feature of the invention. If the Examiner persists with this rejection, Applicants that the Examiner specifically address this feature.

Claim 7 further defines the features of claim 1 and recites logic configured to, when the conflict logic detects a conflict between the plurality of arbiters and the one of the conflicting arbiters has passed a predetermined point in processing, modify the element associated with the conflict such that the higher priority arbiter is immediately able to access a next data element in the resource. Brash also does not disclose this feature of the invention and the Examiner does not specifically address this feature of the invention. If the Examiner persists with this rejection, Applicants request that the Examiner specifically address this feature.

Claims 9-27 also stand rejected under 35 U.S.C. § 103(a) based on Brash. In rejecting these claims, the Examiner states that these claims "are of similar scope as of claims 1-8, and therefore claims 9-27 are rejected for the same reasons." (Office Action, page 5). Applicants disagree with the Examiner's interpretation of claims 9-27. These claims recite features that are not necessarily identical or similar to those recited in claims 1-9. Applicants request that, if the Examiner continues to reject these claims, that the Examiner specifically address the features recited in these claims in any subsequent Office Action.

Independent claim 9, as amended, is directed to a method including examining a plurality of arbiters that arbitrate among a plurality of queues for conflicts among the plurality of arbiters in arbitrating the plurality of queues; determining, when conflicts occur in arbitrating the plurality of queues, whether one of the conflicting arbiters has reached an arbitration point beyond a

predetermined commit point; and invalidating processing in the one arbiter related to the conflict when the one arbiter is not beyond the commit point.

Applicants submit that Brash does not disclose or suggest the features of this claim. As discussed above, Brash does not disclose a plurality of arbiters. Further, Brash does not disclose or suggest examining a plurality of arbiters that arbitrate among a plurality of common queues for conflicts among the plurality of arbiters in arbitrating the plurality of queues, as recited in claim 9. Even if low priority section 252 and high priority section 254 of Brash were considered to correspond to the plurality of arbiters recited in claim 9, these elements of Brash are specifically disclosed by Brash as arbitrating over different input lines, accordingly, they cannot reasonably be said to arbitrate among a plurality of common queues.

Claim 9 further recites "determining, when conflicts occur in arbitrating the plurality of queues, whether one of the conflicting arbiters has reached an arbitration point beyond a predetermined commit point; and invalidating processing in the one arbiter related to the conflict when the one arbiter is not beyond the commit point." Brash does not disclose or suggest any such feature. In rejecting claim 1, the Examiner seems to state that the disclosure of Brash relating to allowing only a single grant to issue at any instant of time somehow relates to "altering processing." (Office Action, page 3). Applicants submit that claim 9 recites significantly more than simply altering processing in an arbiter. Specifically, claim 9 recites, for example, invalidating processing in the one arbiter related to the conflict when the one arbiter is not beyond the commit point.

Applicants submit that Brash completely fails to disclose or suggest this aspect of the invention. Brash does not disclose invalidating processing in an arbiter, nor does Brash disclose taking an action when an arbiter is not beyond a commit point.

For at least these reasons, Applicants submit that Brash does not disclose or suggest the features of claim 9 and the rejection of this claim should therefore be withdrawn. The rejections of claim 10-16, at least by virtue of their dependency on claim 9, should also be withdrawn. Further, these claims recite additional features not disclosed or suggested by Brash.

Claim 10, for example, further defines the features of claim 9 and recites modifying the queue associated with the conflict so that a next data item in the queue is advanced to a head position in the queue when the lower priority arbiter is beyond the commit point. Applicants submit that Brash completely fails to disclose or suggest this feature of the invention.

Independent claim 17 is directed to a device comprising a number of features, including a plurality of queues; a first arbiter; a second arbiter; and conflict detection logic coupled to the plurality of queues, the first arbiter, and the second arbiter, the conflict detection logic detecting conflicts between the first and second arbiters in arbitrating the plurality of queues, and, when a conflict is detected, altering processing relating to the conflict in the second arbiter when the second arbiter has not passed a predetermined commit point in processing a queue.

Based on rationale similar to that given above, Applicants submit that Brash does not disclose or suggest a number of the features recited in claim 17. For example, Brash does not disclose the first and second arbiters recited in claim 17. Brash also does not disclose or suggest conflict detection logic detecting conflicts between the first and second arbiters in arbitrating the plurality of queues. Elements 252 and 254 of Brash operate on independent input lines, and there would thus not be conflicts between these elements.

For at least these reasons, Applicants submit that Brash does not disclose or suggest the features of claim 17 and the rejection of this claim should therefore be withdrawn. The rejections of claim 18-21 at least by virtue of their dependency on claim 17, should also be withdrawn.

Independent claim 22 is directed to a network device comprising a plurality of processing elements, the processing elements transmitting data items to one another and transmitting the data items to destinations external to the network device. The processing elements include a plurality of queues configured to store the data items before transmission of the data items, a plurality of arbiters that independently arbitrate among data items in the queues, and conflict logic. The conflict logic is configured to detect conflicts among the plurality of arbiters in accessing the queues, and, when a conflict is detected, the conflict logic is configured to clear processing relating to the conflict in one of the conflicting arbiters when the one of the conflicting arbiters has not passed a predetermined commit point.

Brash does not disclose or suggest the features recited in claim 22. Brash, for example, does not disclose or suggest a plurality of processing elements including a plurality of arbiters and the conflict logic recited in claim 22. For reasons similar to those given above, Applicants submit that Brash does not disclose or suggest each of the features recited in claim 22, such as the recited plurality of arbiters and the conflict logic. Accordingly, the rejection of claim 22 is improper and should be withdrawn. At least by virtue of their dependency on claim 22, the rejections of dependent claims 23-27 are also improper and should be withdrawn.

Regarding claims 28 and 29, Applicants note that the Examiner has not addressed the status of these claims in the Office Action. Applicants request clarification on the status of these claims.

Claim 28 is directed to a device comprising means for detecting conflicts among a plurality of arbiters that arbitrate among a plurality of queues; means for determining, when conflicts are detected by the means for detecting, whether one of the conflicting arbiters has reached an arbitration point beyond a predetermined commit point; and means for invalidating processing relating to the conflict in the one arbiter when the one arbiter is not beyond the commit point. Brash does not disclose or suggest each of the features recited in claim 28 or its dependent claim 29.

In view of the foregoing amendments and remarks, Applicants respectfully request withdrawal of the outstanding rejections and the timely allowance of this application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

HARRITY & SNYDER, L.L.P.

By: _____
Brian Ledell
Reg. No. 42,784

Date: July 20, 2005
11240 Waples Mill Road
Suite 300
Fairfax, VA 22030
Telephone: (571) 432-0800
Facsimile: (571) 432-0808

Amendments to the Drawings:

Subject to the approval of the Examiner, please replace the drawing sheets labeled Figs. 1, 2, and 4, with the attached Replacement Drawing Sheets Fig. 1, 2, and 4.

Attachment: Three Replacement Sheets